REMARKS

In the above identified Office Action, the Examiner required that the format of the Abstract of the Disclosure be corrected to comply with Patent Office requirements. A new Abstract page is attached as an appendix hereto.

The Specification has been amended hereby at page 24 to correct Table 4 to indicate that the temperature columns are in degrees centigrade.

Claims 1 to 3 have been amended in order to overcome the Examiner's objections to the claims contained in paragraphs 3 and 5 of the Office Action. Claim 1 has also been amended by inserting therein "when the polyhedral oligomeric silsesquioxane connects to ends or side chains of the polyimide and forms self-assembled architecture" which is taken from the Specification, page 8, line 26 to page 9, line 1.

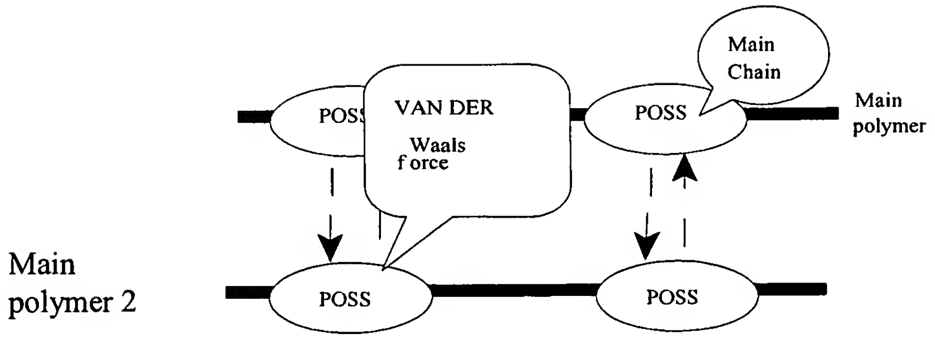
In the Office Action, the Examiner rejected the claims as being anticipated under 35 U.S.C. 102(e) by U.S. Patent No. 6,767,930, to *Svejda et al*, granted June 27, 2004. It is believed that the amendment to Claim 1, described above, defines sufficient structure for the claimed composite to distinguish it from the composite disclosed in the cited *Svejda et al* reference.

In the *Svejda et al* reference, although the nanocomposites are formed through covalent bonding by using POSS and POS as the repeating units, their molecular architecture is a linear type wherein each

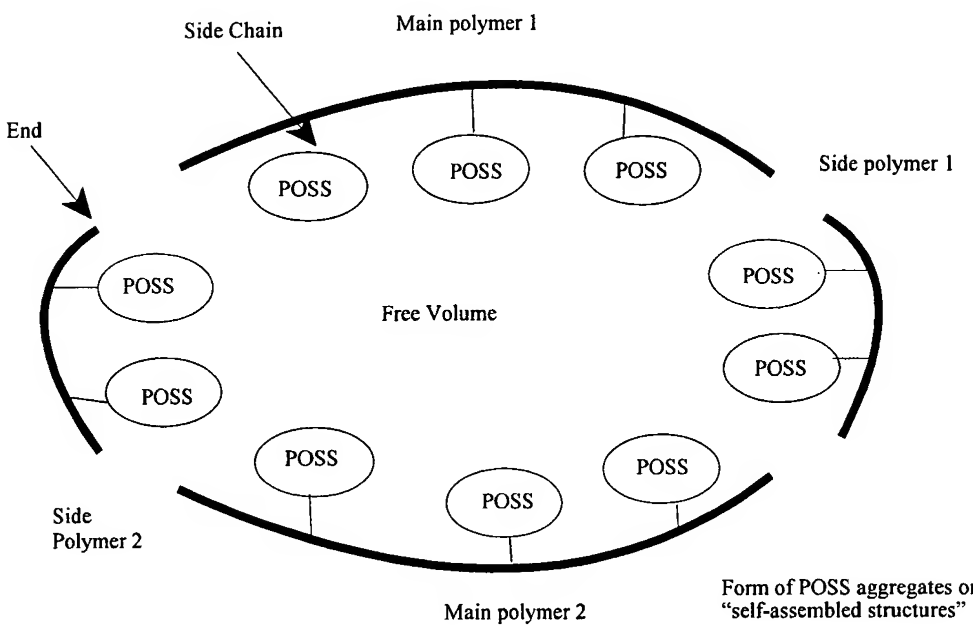
of the POSS is tethered to the polymer main chains through both ends of POSS, as clearly seen in Figures 7 and 10 of the *Svejda et al* reference. These nanocomposites yield improved mechanical properties and heat resistance as shown in Table 2 of the reference, but do not have lower dielectric constant than that of pure polyimide without POSS. The *Svejda et al* reference's nanocomposites do not have the "self-assembled structures" which is critical to the present application because in the reference's molecular architecture, both ends of the POSSes are bonded to repeating units in the polymer main chains and therefore cannot have the freedom to interact with more than one POSS in other polymer main chains to form large POSS aggregates or "self-assembled structures." Such "self-assembled structures" contain large space or free volume between polymer chains and is critical to the reduction of the polyimide dielectric constant.

On the other hand, in the present application, the molecular architecture is different because POSS is in the side chain of polymers, wherein each POSS is bonded to polyimide main chains through a spacer that attaches one end of POSS only and it is a branched-type molecular architecture. The essential difference in the molecular architecture between *Svedja's* nanocomposites and the present application is that the present application discloses that all caged POSSes are positioned in the side chains of polymers. These dangling side-chain-tethered POSSes therefore have more freedom to interact with several side-chain-tethered POSSes attached to other polymers to form large POSS aggregates or self-assembled structures and create large free volume between polymer chains.

A schematic representation comparing the molecular architectures of the *Svedja et al* reference and the present application is as follows:



Svejda et al nanocomposites



Wei et al nanocomposites

As can be seen in the above schematic, because the spacer between the main chain and caged POSS of *Wei et al* is flexible, this side-chain-tethered caged POSS can interact with several other side-chain-tethered caged POSSes and form large POSS aggregates or self-assembled structures. This

morphology in turn creates large free volume between polymer chains. When the free volume increases, the volume of void (air) also increases, and the dielectric constant of the polymer possessing the side-chain-tethered POSS molecular architecture decreases accordingly.

In view of the above, it is respectfully submitted that the claims remaining in the application, Claims 1 to 4, are not anticipated by U.S. Patent No. 6,767,930, to *Svejda et al* and should therefore be allowed. Such action is respectfully solicited.

Respectfully submitted,
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I hereby certify that this document is being deposited with the U.S. Postal Service on March 20, 2006, as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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